CLAIMS

1. A Y-zeolite-containing composite material, characterized in that said composite material comprises nest-like structure.

2. The composite material according to claim 1, characterized in that said composite material is made from materials comprising kaolin by in-situ crystallization.

3. The composite material according to claim 2, characterized in that said composite material comprises Y-zeolite in the content of 30-85% by weight and matrix formed after crystallization of the materials comprising kaolin.

4. The composite material according to claim 3, characterized in that the content of Y-zeolite is in the range of 30-70% by weight of composite material.

5. The composite material according to claim 1, characterized in that said nest-like structure is comprised of at least 70% of rodlike crystal, wherein said rodlike crystal has a diameter of 50-200 nm and a length of 100-600 nm.

6. The composite material according to claim 5, characterized in that said nest-like structure further comprises flaky crystal or blocky crystal, wherein blocky crystal has an equivalent diameter of about 50-500 nm and flaky crystal has a thickness of about 50-200 nm.

7. The composite material according to claim 1, characterized in that the crystal size of said Y-zeolite is in the range of 10-400 nm, and the equivalent diameter of said nest-like structure is in the range of 1000-3000 nm.

8. The composite material according to claim 5, characterized in that said rodlike crystal, flaky crystal and blocky crystal are comprised of matrix formed after in-situ crystallization of the materials comprising kaolin and Y-zeolite on the surface of said matrix.

9. The composite material according to claim 2, characterized in that said materials comprising kaolin is selected from hard kaolin or soft kaolin.

10. The composite material according to claim 1, characterized in that the apparent bulk density of the composite material is 0.50-0.75 g/cm^3 and the surface area is 280-800 m^2/g.

11. The composite material according to claim 1, characterized in that the volume of 17-3000 Å mesopore measured by the BET method is 0.03-0.076 ml/g, accounting for 10-35% of the total volume of the pore.

12. The composite material according to claim 1, characterized in that the SiO_2/Al_2O_3 ratio in Y-zeolite is 4.0-5.5 by mole.

13. The composite material according to claim 1, characterized in that said Y-zeolite is selected from the group consisting of NaY, HY, REY and REHY.

14. A process for preparing the composite material according to claim 1, comprising the following steps:

(1) Calcining and dehydrating raw material comprising kaolin at 500-690°C to convert it into metakaolin, and then into a powder with diameters less than 230 μm;

(2) Adding sodium silicate, guide agent, solution of sodium hydroxide, and water to metakaolin powder to make a reaction feed with a ratio of (1-2.5)Na_2O: Al_2O_3: (4-9)SiO_2: (40-100)H_2O, wherein the ratio by weight of guide agent to metakaolin is 0.1-1.0;

(3) Crystallizing the reaction feed made in step (2) at 88-98°C under stirring, and then filtering and drying.

15. The process according to claim 14, characterized in that the composition of said guide agent in step (2) is (10-17)SiO_2: (0.7-1.3)Al_2O_3: (11-18)Na_2O: (200-350)H_2O, and the guide agent is made by aging at 4-20°C.

16. The process according to claim 14, characterized in that the temperature for calcining raw material powder in step (1) is in the range of 600-690°C.

17. The process according to claim 14, characterized in that the stirring rate for crystallization in step (3) is 200-1000 rpm and the crystallization time is 16-48 hours.

18. The process according to claim 14, characterized in that the concentration of the added solution of sodium hydroxide in step (2) is 1-10% by weight.

19. The process according to claim 14, characterized in that said kaolin in step (1) is selected from hard kaolin or soft kaolin, containing more than 75% by weight of crystal.

20. The process according to claim 14, characterized in that an auxiliary accounting for 0.1-2.5% by weight of the total reaction feed is further added to the feed in step (2), and the auxiliary is selected from the group consisting of sodium dodecyl sulfonate, hexadecyl trimethyl ammonium bromide, polyethylene glycol, oxalic acid, citric acid, sodium tartrate, or ethylenediamine tetraacetic acid.